clutch of six egg was found 15 November 1985. They are equal in size to the first clutch; length — mean 47.4 ± 2.3 mm, range 44.6 – 50.7 mm; diameter — 27.4 ± 0.6 mm, 26.7 – 28.3 mm; weight — 21.6 ± 0.6 g., 20.6 – 22.3 g. None of these eggs contained embryos. This clutch was buried in the latrine at a depth of approximately 30 cm; the latrine was 3 m on its longest axis and sat on a tall-grass clump of Baruwa (*Saccharum benghalensis*). The specific identity of these eggs is uncertain; both species have similar-sized eggs but different clutch numbers, 1-3 eggs in *M. tricarinata* and 3-8 eggs in *M. trijuga* (Das 1985, E. Moll, pers. comm.).

Adult size and growth

The *M. trijuga* shell found in the Bardia area was 114 mm carapace length (CL) and 110 mm plastron length (PL). A 1.2 kg adult female *M. trijuga* from Chitwan was 215 mm CL and 186 mm PL with a maximum carapace width of 150 mm and a maximum height of 83 mm. This female possessed seven distinct scute layers in addition to the hatchling scute on each plastral plate. This datum suggests that she was at least seven years old, and measurements of pectoral scute layers indicate a 43 mm PL at hatching and an average annual growth rate (PL) of 20.4 mm per year.

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20. *KACHUGA* (REPTILIA, EMYDIDAE) IN NATIONAL CHAMBAL SANCTUARY: OBSERVATIONS ON DIURNAL NESTING EMERGENCES AND UNSUCCESSFUL NESTING CRAWLS

(*With a text-figure*)

Data presented here refer to the period 30 October 1983-5 July 1985 during which we undertook 120 whole-day trips to the field for 'turtle-studies'.

Diurnal nesting emergence:

Kachuga species in Chambal usually nest in the night. Occasionally, nesting may be seen upto 1000 Hrs. in the morning or at as early as 1600 hrs. in the afternoon. Local villagers normally notice those turtles which come out for nesting at dawn or dusk. During 8 of our 120 field-days, we recorded 11 turtles (Table 1) which had nested or had attempted to nest during the day. *K. tentoria* were caught when these were moving away from the water. *K. dhongoka* were found inexplicably lying upside down on the sand bank. Captures of *K. kachuga* were possible because of our speed-boat with which we approach the turtles before these returned to deep water.

In all the above cases the conclusions were made that the turtles had emerged for nesting because of the following (ref. Table 1).

a) Located the nest with eggs	Sl. nos. 2, 7.
b) Found on a nesting bank. Oviducal eggs collected and/ or eggs 'released' by turtle after capture	Sl. nos. 1, 3, 4, 5, 8, 10.
c) Found on or close to a nesting bank during the nesting season. Adult females. Released after marking	Sl. nos. 9 and 11

The minimum temperature during diurnal emergence in December ranged from 3.5° to 9.0°C while the maximum day-time shade temperature was 28°-38°C. During the peak nesting season of *K. dhongoka* and *K. kachuga* when nocturnal nesting is the rule, the minimum and maximum temperatures are 16.2°C-36.9°C (March) and 21.6°-40.1°C (April) (Fig. 1).

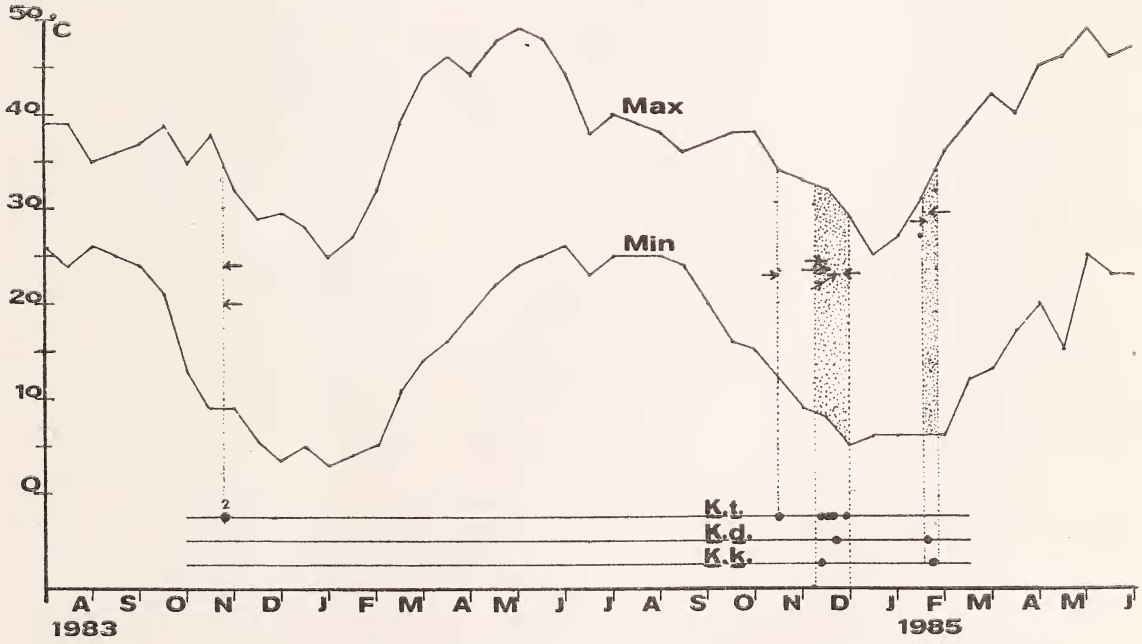

Fig. 1. Diurnal nesting emergences (dots) in *Kachuga tentoria* (*K. t.*), *Kachuga dhongoka* (*K. d.*) and *Kachuga kachuga* (*K. k.*) shown against date and shade temperature (small arrows). The curves show the fortnightly maximum (Max) and minimum (Min) shade temperature recorded at the camp. The number '2' against a dot shows two emergences for the species on the same date.

TABLE 1

DATA ON TURTLES CAPTURED DURING DIURNAL NESTING EMERGENCE. TEMPERATURES REFER TO THE TIME OF CAPTURE

Sl. No.	Date Day/ month/ year	Carapace length (mm)	Place	Distance (Km)*	Time (hrs.) nesting/ capture	Temp°C		Remarks
						Air (shade)	Water (30 cm deep)	
Kachuga tentoria								
1.	24.11.83	250	Rohu	113	0730	20.0	21.0	Unsuccessful nesting attempt. Found 6 oviducal eggs.
2.	24.11.83	230	Batesura	123	1600	24.0	21.0	Successfully nested. Collected 7 eggs from the nest.
3.	15.11.84	250	Baroli	57	1140	23.0	22.0	Unsuccessful nesting. attempt. Found 9 oviducal eggs.
4.	13.12.84	185	Ranipura	307	1300	23.5	20.5	Unsuccessful nesting attempt. Found 5 oviducal eggs.
5.	15.12.84	205	Udi	352	1530	24.5	21.0	Unsuccessful nesting attempt. Found 3 oviducal eggs.
6.	17.12.84	235	Kenjra	296	1630	23.5	21.5	Unsuccessful nesting attempt. Found 8 oviducal eggs.
7.	27.12.84	224	Papripura	213	1400	23.0	20.0	Successfully nested. Collected 5 eggs from the nest.
Kachuga dhongoka								
8.	17.12.84	415	Khera Azab Singh	362	1130	23.0	20.0	Found upside down on a sand bank 10 m away from water. Turtle dropped 17 eggs in the tank to where it was shifted. One egg in left oviduct.
9.	19.2.84	460	Barotha	79	1600	28.5	22.0	Found upside down on a sand bank 18 m away from water. Marked and released.
Kachuga kachuga								
10.	13.12.84	560	Kenjra	296	1200	23.0	20.0	Found very close to water (0.5m). started dropping eggs during transit to pen, 100 km. away. Total 17 eggs (incl. 5 from left oviduct).
11.	20.2.84	540	Rohu	113	1500	29.5	23.5	Found 4 m away from water. Marked and released.

* In reference to Palighat (Parbati-Chambal confluence) in the upstream.

Unsuccessful nocturnal nesting crawls:

During our early morning check, we have observed 31 night crawl marks of turtles which led out of water (that could be only for nesting) but returned without egg laying (Table 2). Eighteen such crawl marks on a potential nesting site were accompanied or superimposed by jackal tracks. The tracks of the jackal (egg-predator) were seen for the entire length of return track of the turtle and only a part of the onward track. Such instances are viewed to be interference from the predator due to which the turtles did not nest.

TABLE 2

UNSUCCESSFUL NOCTURNAL NESTING EMERGENCES

Species Track	No. of instances	Probable reason for not nesting
SMALL TURTLE		
(*K. tentoria*)	3	Unsuitable Ground.
	11	Pursued by jackal.
LARGE TURTLE		
(*K. dhongoka* or	9	Unsuitable Ground.
K. kachuga)	1	Rain (a half-dug nestpit located).
	7	Pursued by jackal.
Total	31	

DISCUSSION

Although dusk to dawn is the time for nesting by *Kachuga* species in Chambal, diurnal nesting may also occur. Such diurnal nesting may be related to the turtles' temperature requirement and/or a turtle's past experience of repeated harassment during nesting crawl by an egg-predator. These aspects need further study.

Jackals are the main predators of turtle eggs in Chambal. The instances recorded in the above regarding aborting a nesting attempt due to interference by egg predator are rather rare and raises questions like — 'how is a turtle's nesting emergence related to predator activity? When a predator is 'busy' in following a turtle expected to nest, is it advantageous to other nesting females? How can these aspects be qualified?

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21. NEW LOCALITY RECORD FOR THE INDIAN PEACOCK SOFTSHELL TURTLE *TRIONYX HURUM*

Three species of softshell turtles (Family: Trionychidae) in the genus *Trionyx* are known to occur in India. These include the Indian softshell turtle *Trionyx gangeticus* Cuvier from the rivers and reservoirs of northern India and the Leith's softshell turtle *Trionyx leithii* Gray from the southern Indian rivers and reservoirs. The distribution of the third species, the Indian peacock softshell turtle *Trionyx hurum* Gray, is generally given as the lower reaches